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Soybean rust: A research update

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ICM > 2007 > IC-498 (2) -- February 26, 2007

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Soybean rust: 2006 in review and 2007 update

by Daren Mueller, Department of Plant Pathology

Experts at Iowa State University have pointed to three factors that need to happen for soybean rust to get to Iowa: overwinter, movement of rust spores, and favorable environmental conditions. For 2006, environmental conditions in Iowa were not favorable for disease development throughout most of June and July but improved with the frequent rains late in the summer. However, because the pathogen never made it to Iowa, these environmental conditions were of no consequence.

Overwintering

Rust was found earlier and more widespread in 2006 compared with the winter of 2005 (Figure 1). The first infection of soybean rust discovered in 2006 was on kudzu in Alabama and Florida in early January. In 2005, the first report of rust was not until late February.

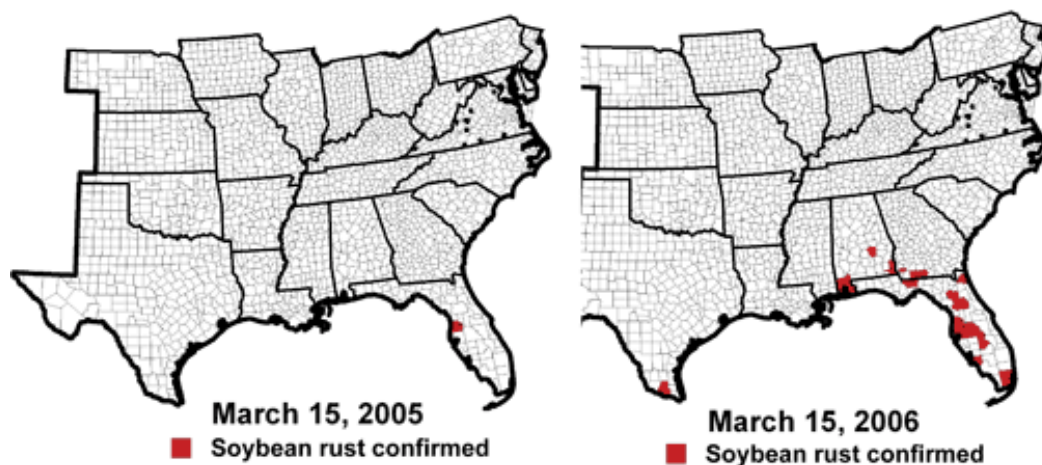


Figure 1. Overwintering sites for soybean rust on kudzu in 2005 and 2006.

Movement of rust

Movement of rust depends on the inoculum (rust spores) building up at sites with infected plants and the movement of these spores to new areas for disease to be established. These two steps need to be repeated several times for rust to move toward Iowa.

During 2006, very dry conditions plagued much of Florida, Georgia, and Alabama (the three states where rust survived on kudzu) so numbers of spores never increased to appreciable levels in these overwintering sites. These dry conditions persisted throughout the growing season. Like 2005, by the middle of August there was still no threat of soybean rust in Iowa

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and most of the soybean crop was close enough to harvest that management of rust was no longer a concern (Figure 2).

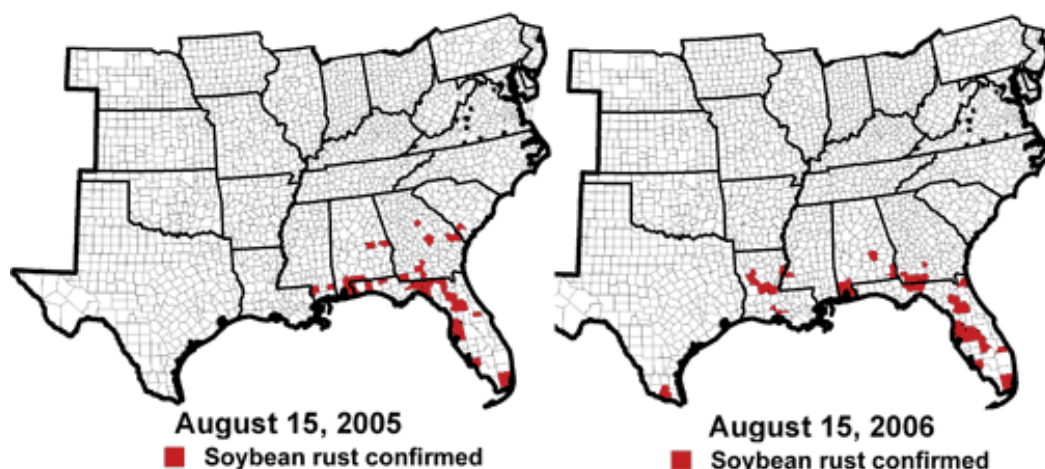


Figure 2. Distribution of soybean rust in August 2005 and August 2006.

After a hot, dry summer in the South with very little pathogen/disease movement, soybean rust made a late push both up the East Coast and into the Ohio River Valley. Soybean rust season totals were 274 counties total in 15 states with the majority of finds on soybean. This is over double the number of positive rust finds in 2005 (Figure 3).

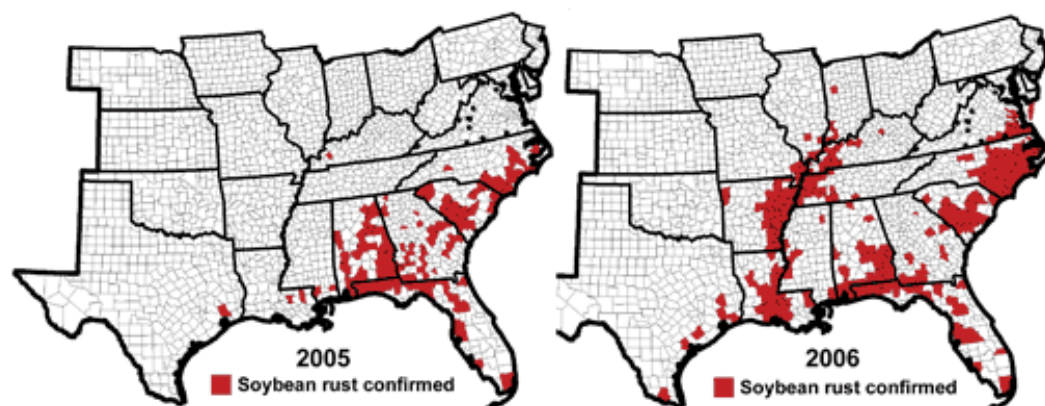


Figure 3. Distribution of soybean rust at the end of 2005 and 2006.

The late-season movement was important because epidemiologists were able to collect valuable data for predicting movement in subsequent years. Another important factor was that the late-season movement of rust gave the extension/scouting teams in several neighboring states an opportunity to identify low levels of rust. One of the challenges for management of rust will be timely applications of fungicides, and in order to accomplish this, Iowa growers will need to keep a close eye on the national movement of rust at critical times during the season. Scouting for rust in the field could be a very difficult task. The fact that many of the states south of Iowa have experience identifying low levels of rust should help with early detection in these states and give Iowa growers more confidence when determining the national movement of rust, especially as it nears Iowa.

X. B. Yang has emphasized the importance of soybean rust becoming established in Texas, Louisiana, and Mississippi. If it overwinters in the Mississippi Delta or moves to this region from Florida or Georgia early in the year, rust could become a much bigger threat to Midwestern soybean growers. The movement of rust during October 2006 gives us a good example of how quickly rust can move into the Midwest if inoculum builds up in the wrong places.

Remember that these late findings of rust will have no bearing on the chances of the disease arriving in Iowa in 2007. The soybean rust pathogen needs green tissue to survive. Wherever there is a hard freeze there will be a completely clean slate in regard to the chances of soybean rust the next year.

Early indication for soybean rust in 2007. Rust has been reported in Florida, Georgia, and Alabama in early January 2007, indicating that kudzu survived at least one cold front that pushed deep into the South in late December 2006. However, the cold front that Iowans have experienced recently has made its way to these southern states and has killed back kudzu south of Gainesville, Florida. Temperatures were reported in the low twenties across many of these states.

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